

Application No.: 10/006,860
Amendment Dated: June 29, 2004
Reply to Office Action of: April 13, 2004

MTS-3296US

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) An asynchronous FIFO circuit comprising:

a memory;

asynchronous reading and writing means of reading a predetermined amount of data from and of writing the predetermined amount of data into said memory on a first-in-first-out basis, the predetermined amount of data including a plurality of words stored in a respective plurality of address locations of the memory;

an error write counter of counting counts up by 1 for each word of the plurality of words containing an error flag that is written into said respective plurality of address locations;

an error read counter of counting up by 1 for each word of the plurality of words containing an error flag that is read from said respective plurality of address locations;

comparing means of comparing a value of said error write counter with a value of said error read counter, said comparing means outputting a logic level of 0 when the value of said error write counter is coincident with the value of said error read counter, and said comparing means outputting a logic level of 1 if the former value is different from the latter value, wherein the logic level of 1 indicates at least one error flag is set in the plurality of words stored in the respective plurality of address locations.

2. (Currently Amended) An asynchronous FIFO circuit comprising:

a memory having addresses for 2^N words, N being a positive integer;

a write pointer of counting up by 1 when writing data into said memory is completed, said data including a plurality of words stored in a respective plurality of address locations of the memory, said write pointer counting up by 1 if the memory is not in a full state where the memory is full of data;

a read pointer of counting up by 1 when reading data from said memory is completed, said data including a plurality of words stored in a respective plurality of address locations of the memory, said read pointer counting up by 1 if the memory is not in an empty state where all data has been read from said memory;

a previous read pointer of outputting an output incremented by 1 when reading data is completed, said previous read pointer outputting an output incremented by 1 if said memory is not in the empty state, said previous read pointer always outputting the output of one less value than the value of said read pointer;

an empty flag generating circuit of detecting an empty state when a value of said write pointer is coincident with a value of said read pointer;

a full flag generating circuit of detecting the empty state of said memory when the value of said write pointer is coincident with a value of said previous read pointer;

a write pointer decoder of decoding the value of said write pointer to generate an address at which data is allowed to be written into said memory;

a data selector of selecting data from an address obtained by decoding the value of said read pointer;

a write flag OR circuit of taking a logic sum of predetermined bits contained in data written into said memory;

a read flag OR circuit of taking a logic sum of predetermined bits contained in data read from said memory;

an error write counter of counting up by 1 if said write flag OR circuit outputs a true logic level when data is written into said memory, the error write counter counting up by 1 for each word of the plurality of words containing an error flag that is written into said memory;

an error read counter of counting up by 1 if said read flag OR circuit outputs a true logic level when data is read from said memory; the error read counter counting up by 1 for each word of the plurality of words containing an error flag that is read from said memory; and

an error comparing circuit of comparing a value of said error write counter with a value of said error read counter to detect whether the value of said error write counter and the value of said error read counter coincide,

wherein the error comparing circuit outputs a logic level of 0 when the value of said error write counter is coincident with the value of said error read counter, and said error comparing circuit outputs a logic level of 1 if the former value is different from the latter value, and

the logic level of 1 indicates at least one error flag is set in the ~~data~~plurality of words stored in the memory.

3. (Original) The asynchronous FIFO circuit according to claim 1 or 2, wherein said error write counter and said error read counter are formed of a gray code counter.

4. (Currently Amended) An asynchronous FIFO data reading and writing method comprising:

an asynchronous reading and writing step of reading a predetermined amount of data from and writing the predetermined amount of data into a memory on a first-in-first-out basis, the predetermined amount of data including a plurality of words stored in a respective plurality of address locations of the memory;

an error write count step of counting up by 1 if ~~the predetermined amount of data~~ for each word of the plurality of words containing an error flag that is written into said memory contains an error respective plurality of address locations;

an error read count step of counting up by 1 if ~~the predetermined amount of data~~ for each word of the plurality of words containing an error flag that is read from said memory contains an error respective plurality of address locations;

a comparing step of comparing a value of said error write count step with a value of said error read count step, said comparing step outputting a logic level of 0 when the value of said error write count step is coincident with the value of said error read count step, and said comparing step outputting a logic level of 1 if the former value is different from the latter value, wherein the logic level of 1 indicates at least one error flag is set in the ~~predetermined amount of data stored in the memory~~ plurality of words stored in the respective plurality of address locations.

5. (Currently Amended) An asynchronous FIFO data reading and writing method comprising:

a write point step of counting up by 1 when writing data into a memory is completed, said memory having addresses for 2^N words, N being a positive integer, said write point step counting up by 1 if the memory is not in a full state where the memory is full of data, said data including a plurality of words stored in a respective plurality of address locations of the memory;

a read point step of counting up by 1 when reading data from said memory is completed, said read point step counting up by 1 if the memory is not in an empty state where all data has been read from said memory, said data including a plurality of words stored in a respective plurality of address locations of the memory;

a previous read point step of outputting an output incremented by 1 when reading data from said memory is completed, said previous read point step outputting an output incremented by 1 if said memory is not in the empty state,

said previous read point step always outputting the output of one less value than said read pointer;

an empty flag generating step of detecting an empty state when a value of said write pointer is coincident with a value of said read point step;

a full flag generating step of detecting the full state of said memory when the value of said write pointing step is coincident with a value of said previous read pointing step;

a write pointer decode step of decoding the value of said write pointing step to generate an address at which data is allowed to be written into said memory;

a data select step of selecting data from an address obtained by decoding the value of said read pointing step;

a write flag OR step of taking a logic sum of predetermined bits contained in data written into said memory;

a read flag OR step of taking a logic sum of predetermined bits contained in data read from said memory;

an error write count step of counting up by 1 if said write flag OR step outputs a true logic level when data is written into said memory, an error write counter counting up by 1 for each word of the plurality of words containing an error flag that is written into said memory;

an error read count step of counting up by 1 if said read flag OR step outputs a true logic level when data is read from said memory, an error read counter counting up by 1 for each word of the plurality of words containing an error flag that is read from said memory; and

an error comparing step of comparing a value of said error write count step with a value of said error read count step to detect whether the value of said error write count step and the value of said error read count step coincide,

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wherein the error comparing step outputs a logic level of 0 when the value of said error write count step is coincident with the value of said error read count step, and said error comparing step outputs a logic level of 1 if the former value is different from the latter value, and the logic level of 1 indicates at least one error flag is set in the ~~predetermined bits~~plurality of words stored in the memory.

6. (Previously Presented) The asynchronous FIFO data reading and writing method according to claim 4 or 5, wherein said error write count step and said error read count step are formed of a gray code count step.